The Laval Separator Co.

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PHALADE LAVAL

"BABY"

Cream Separators

(A MODEL DAIRY FARM)

UP-TO-DATE DAIRYING

A PRACTICAL EDUCATION IN THE VARIED ADVANTAGES OF CENTRIFUGAL SEPARATION

Nº 290

Copyright Feb'y, 1900
The Laval Separator Company.

HIGHEST AWARD
WORLD'S COLUMBIAN EXPOSITION
CHICAGO, 1893

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L.C.H. May 1912
SF247
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1900

SOME OF THE BENEFITS . . .

A DE LAVAL CREAM SEPARATOR

. . . WOULD CONFER UPON YOU

-
1. *Save 10% to 50% in skimming.*
2. *Save 5% to 10% in churning.*
3. *Increase butter value 5% to 50%.*
4. *Save time and labor.*
5. *Save ice and water.*
6. *Insure purity of product.*
7. *Remove tuberculosis and disease germs.*
8. *Give a much superior cream.*
9. *Give cream of any desired density.*
10. *Give warm, fresh, sweet skim-milk.*
11. *Obviate "scours" in calves.*
12. *Give the best aeration.*
13. *Do away with taints and odors.*
14. *Enhance keeping qualities.*
15. *Save women's and house work.*
16. *Save one-half time in churning.*
17. *Save storing and handling of ice.*
18. *Save milk and ice-houses.*
19. *Save multitude of utensils.*
20. *Save washing and care of utensils.*

SAVE \$10 PER COW PER YEAR

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SECTIONAL VIEW OF AN

Improved "Alpha" De Laval Cream Separator

7033
Mar. 16. 1902.

THE DE LAVAL “DAIRY”

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CREAM SEPARATORS

The purpose of the Cream Separator is the quick and complete separation of cream from milk in the most practical and profitable manner possible.

Natural Forces Only

Centrifugal separation is the application of mechanical science to the natural laws governing the creaming of milk. Centrifugal force is the natural force which is generated by high velocity, or in other words rapid revolution. When applied to liquids or other substances of different specific gravity, or weight, centrifugal force greatly intensifies such differences, drawing the lighter particles to the centre of motion and driving the heavier ones to the periphery or outer circle.

That which nature does imperfectly and with a varying degree of effectiveness in the old way, by reason of the difference in specific gravity or weight between the cream or fat particles and the other parts of milk, as utilized in the many different forms of setting appliances, the Cream Separator, by the employment of centrifugal force, quickens, makes much more thorough, and improves in every respect. Hence, while the process is seemingly mechanical, it is in

reality, but the addition of centrifugal force to gravity, or the use of *two* natural forces *combined* instead of only *one* --in conjunction with the features of mechanical construction necessary to make the process *continuous* and practically *instantaneous*.

Method of Operation

The Separator consists of a small cylindrical steel bowl or vessel, which is incased within and mounted upon a frame provided with the mechanical equipment essential to acquire a high revolving speed with a minimum expenditure of operating power. The whole-milk is *continuously* fed into this rapidly revolving steel bowl, the separation almost instantly effected within it, and the cream and skim-milk *continuously* and *separately* discharged from it; while the machine may be used for a few minutes or as many hours—at a time—as may be necessary, according to the amount of work to be done.

Inventor and Invention

The practical cream separator was the invention of Dr. Gustaf de Laval, of Sweden, long esteemed one of the most practical scientists and useful inventors of the century, and often fitly termed the "Edison of Dairying." It was introduced in Europe in 1879 and in this country a couple of years later. Within these few years the De Laval Separator has wholly revolutionized dairying methods. It has single-handedly made the successful fight in behalf of centrifugal separation and has alone brought about the broad development and universally demonstrated superiority of the new system to all other methods. It has become known and generally used in every civilized country in the world and is as familiar in every country of Europe and Australia as in America. The number of De Laval machines in use now nearly approaches 200,000, and their use and prestige and conceded superiority are world-wide.

Earlier Construction

The earlier De Laval machines were of what is now termed the "plain" or "hollow" bowl type as originally designed. For the first few years the separator was built for power operation only, so that its utility was mainly confined to creamery or factory use. As centrifugal separation became more general on a larger scale the need became apparent of smaller separators, that would make centrifugal separation feasible in every variety of dairying and creaming of milk.

In the Spring of 1887 the De Laval Company introduced in America the first Hand Separators, in several styles. These machines, like the factory ones, were of the "hollow" bowl type. They were of course, crude and inferior in every way in comparison with the improved machines of to-day, being cumbersome in construction, heavy running, and of small capacity. They attained a fairly large sale, however, and, together with what the power machines had already achieved in factory separation, laid the foundation of that which has proved the greatest progressive step in the history of all dairying—centrifugal separation.

From 1883 to 1890 many improvements had been effected in the mechanical construction and operation of the separators. But a few years of practical separation experience, even prior to the introduction of the smaller machines, had begun to make evident the need of greater capacity and still closer separation under varying conditions. This it was found futile to attempt to accomplish through larger machines, beyond limits soon reached, as, with the necessarily very high speed of the separator, that meant the use of too much power and the certain sacrifice of safety against frequent bursting. With the coming of the hand or dairy machines the deficiencies and difficulties of the "hollow" bowl type of construction became still more apparent, as in such use particularly are ample capacity, ease of operation,

and durability under the conditions of ordinary farm use *very important* factors in the problem of separator construction. Hence the De Laval Company earnestly devoted its resources to the improvement of the existing type of cream separator.

The "Alpha Disc" System

In 1890, after several years of experimentation, these efforts upon the part of the De Laval makers and the mechanical scientists they had brought into association with themselves, were rewarded by the invention of the so-called "Alpha-Disc" process of separator bowl construction and separation. The moment the principle of the new invention was revealed it was at once apparent that the difficulties experienced in "hollow" bowl separation would be fully overcome, and the "Alpha" invention speedily proved as great an advance over the earlier process of centrifugal separation as such "hollow" bowl separation had been before over gravity creaming. It brought about much greater capacity and much greater efficiency, with even less size and less speed than had been previously used in "hollow" bowl construction.

The "Alpha-Disc" system was immediately introduced into the factory or creamery sizes of the De Laval machines. It at once doubled, and with further development has since trebled, the capacities and relative efficiency of the "hollow" bowl sizes of these machines. In the use of such creamery machines, which had then become almost universal, the new "disc" system at once started the same sort of progressive revolution that the introduction of the "hollow" bowl separator had in the first place. Hundreds of "hollow" bowl factory machines, including many of later imitating makes, have been cast aside and replaced every year since that time, until to-day the use of factory cream separators by well-informed and experienced creamery operators is almost exclusively confined to the "Alpha-Disc" type of same.

In small machines the "Alpha-Disc" system made possible what the De Laval makers had been seeking and striving for—small separators of such capacity, efficiency, ease of operation, extreme simplicity, and at the same time reasonable cheapness, as to meet the requirements of such use. The successful introduction of the new "disc" system into the power machines was quickly followed in 1890–1891 by its utilization in the De Laval "Baby" or Dairy Cream Separators—the first and smallest of which was given such trade-mark name by reason of its being in reality the "baby" of the separator family. These machines have been further perfected from year to year, have rapidly multiplied in number in use, and have long since come to be looked upon as the very highest attainable standard of economy and practicability in the separation of cream from milk.

Method of "Alpha-Disc" Separation

The "Alpha" invention places in the separating bowl a system of round and sloping steel "discs" or plates, one above another, which form a series of sections or compartments, by means of which the milk passing through the bowl is *divided into thin layers or strata* and is *thus* subjected to the centrifugal force developed by the revolving speed of the bowl *in thin sheets*, instead of in practically *solid bulk*, as is the case in the "hollow" type of bowl. There are from 25 to 60 of these dividing discs or plates used in the separating bowl, according to its size. The accompanying cut shows a bowl interior. The left-hand side of the cut shows the appearance of the discs with the shell of the bowl removed. The right-hand side of

the cut shows a *sectional* view of the same discs, as will be understood. The number of discs is lessened in the cut to illustrate them more plainly. The spaces between the discs are less than one-eighth of an inch.

Each one of these different sections or disc divisions becomes, in a sense, a complete and distinct separating factor of itself. It makes of the whole a *combination* and *concentration* of from 25 to 60 contributory separating agencies, according to the size of the machine, *into a single bowl*.

In the operation of the "Alpha-Disc" bowl the incoming whole-milk is carried down into the centre of the bowl through a central shaft, from whence it is distributed in thin layers throughout the spaces or compartments created by the discs or plates. It will be noted that these separating compartments are *inclined* and are *less than one-eighth of an inch* in depth. The milk is *thus* subjected to the separating process, and instead of the fat particles and skim-milk particles having to *fight* their way inward and outward in constant direct struggle with each other, as is the case in the older or "hollow" type of bowl, the *conflicting struggle* of the separating particles is altogether obviated. The cream particles, in the less than one-eighth of an inch space between different discs, press *inward* until they strike the inclined upper surface of the underlying disc and then form an inclined *upward* current along the surface of such disc until they reach the cream wall around the central shaft of the bowl, whence they flow upward and out through the cream discharge. The skim-milk particles have the smallest

fraction of an inch to go *outward* until they strike the disc lying above the particular separating space, passing in a current *down* the inclined under surface of such disc until they reach the skim-milk wall at the outer edge of the series of discs, and then upward to the skim-milk discharge outlets. This process is illustrated in the accompanying cut, showing a partial half-section of an "Alpha" bowl in operation.

The fact that the centrifugal force is thus applied to the milk *under the most effective conditions possible* will be plainly apparent. As is demonstrated, the separation takes place *in thin sheets*, under which circumstances the effect of the centrifugal force of itself is naturally very much greater than would be the case in larger bulk; while the separation once accomplished there is no further commingling of the separated particles—the cream passing one way, without interference, and the skim-milk the other.

Consequent Advantages

The resulting benefits may be readily comprehended by any one, even though wholly unfamiliar with centrifugal separation. The *relative capacity* of the two types of bowls, of equal size and of equal speed, *is at least trebled*. By this it is meant that the placing of the "Alpha" discs into any "hollow" bowl will—at the same speed—give it at least *three times greater capacity*, with equal thoroughness of separation. It is not practicable, however, to utilize the full benefit of the "Alpha" improvement in capacity. It is wiser and much more practicable to make the bowl of smaller size and to reduce the necessary speed. This enables the mechanical construction of a much more practicable, much easier running, and much more durable form of separator. Aside from these available benefits in capacity and speed, the separation becomes much more nearly complete than is possible in the "hollow" type of bowl; the essential temperature of milk is materially

reduced ; the cream may be run of any desired density, and is more even in texture and more thoroughly churnable ; the quality of the after product is improved by the lower temperature permissible and the greater removal of the fibrous and other deleterious matters found in greater or less degree in all kinds of milk ; the purity of the product is insured by the removal of tubercular and other disease germs ; the reduction in size and speed of bowl naturally means the saving of much power, much less wear, and proportionately greater durability, while the mechanical construction of the machine becomes more generally practical in every way. On top of all, there is still left a margin and *reserve* capability of effectiveness sufficient to offset the *varying conditions* and carelessness of operation naturally experienced in practical use.

Advantages of Centrifugal Separation

While the merits of centrifugal separation are quite generally understood, dairymen in many instances fail to properly appreciate that it is *invariably applicable to their own individual conditions*, and that to every one separating cream from milk—regardless of the quantity—it offers a means of better and more satisfactory results and sufficiently greater returns to make it a profitable and almost *necessary* investment. The advantages of centrifugal separation are too varied and far-reaching to permit of full or extended enumeration, but those which are more general and material may be briefly explained :

Thoroughness of Creaming

Thoroughness of separation is under nearly all circumstances the first and most important of the benefits resulting

from centrifugal creaming. A thorough separation is not possible with any form of gravity setting, even under the most favorable conditions. There is a varying percentage of fat in all milk which will not rise to the surface with any degree or amount of setting, at any time. Aside from this, with every setting process, there are invariably losses from one cause or another—condition of cow, breed of cow, time of cow in lactation, condition of milk, lack of ice or of sufficiently cold water, varying temperatures, weather and climatic influences, and the degree of care used. The separator does away with all these *doubtful* results; its work is mechanical in such respects, is affected by none of these conditions, and must of necessity be uniformly complete. The difference is a considerable one, it has never been found to average less than 10% under any circumstances, is more usually 20%, and in many cases—especially in warm countries—often as much as 50%.

“Churnability” of Cream

An evenly and thoroughly churnable cream is of almost equal importance to the separation to begin with. With the old systems much of the butter is always lost in the buttermilk, and occasionally the cream won't churn at all. Some of the causes which make separation difficult in gravity systems at the same time lessen the “churnability” of the cream from such systems. There is a web-like fibrin or viscous matter—varying from numerous conditions—which gradually develops in all milk after it comes from the cow, increasing as the milk ages. This helps materially to retard creaming by setting processes, and being in great part taken with the cream in gravity creaming it affects the gathering of the butter in the churn to even a greater extent than it did the rising of the cream. In the use of the separator the milk is separated very soon after coming from the cow, before the fibrin has had time to but slightly develop, and what little there may be of it is thrown out of

the cream, and left within the bowl. In consequence the separator cream readily and completely turns into butter. The saving of time in churning is fully one-half, the grain and texture of the product are materially better, and the gain in quantity through greater "churnability" will easily average 5% to 10%, if not more.

Betterment of Quality

Separator butter commands the highest prices on every butter market in the world. It stands best for fresh consumption, and best after long keeping. The best trade in every locality can no longer be supplied with anything else. Every dealer, and almost every consumer, recognizes its unquestionable superiority. Almost every butter prize at fairs, conventions, and exhibitions now goes to the "separator-made" entries, and this is invariably the case in all important contests. Separator-made butter scores from five to twenty-five points higher than the most carefully made gravity-system product.

The absolute uniformity of the separator process must result in a better product. The milk is creamed fresh from the cow in its best possible condition, and with less liability to taints than in setting, while the removal of filth from it by the action of the machine can hardly be appreciated by one never having seen a separator bowl after a separation. Then the eradication of the likely disease bacteria and tubercular germs, which the "Alpha-Disc" centrifugal separation effects, together with the fibrous matters, is of inestimable importance, and is elsewhere spoken of in greater detail. Additionally, there is the advantage of the thorough aeration of the milk and cream—centrifugal separation being by far the most efficient of all forms of aeration. Separator users are easily getting an average of ten per cent. more for their product than they were before using the machines, and in many cases the difference in value is even much greater.

Skim-Milk

The skim-milk is a dairying product which the use of the separator altogether changes in its value and usefulness in every respect. Warm, fresh and sweet from the separator, mixed with ground meal, it makes the best possible calf food, and is fully as nutritious thus used as the whole-milk itself. Some users are in this way getting greater actual returns out of their *skim-milk* than other farmers out of their *whole-milk*. Some users find their skim-milk to net them \$1.00 per 100 lbs. in calf feeding, while their neighbors sell their calves and cart their whole-milk to a cheese factory for a less amount. With separator skim-milk there is no "scouring" nor other digestive troubles with calves. Some separator users near cities get almost as much for their sweet, fresh skim-milk for household, bakery and like purposes, as many dairy farmers realize from their whole-milk. In the use of setting systems the skim-milk is almost valueless in any of these ways, since in standing the bacterial growth develops rapidly and the sugar of milk, which is extremely nutritious in its natural condition, changes into an acid which is harmful rather than beneficial to both the animal and human stomach. The value of the skim-milk is easily trebled through the use of the separator.

Cream

If to be used for the production of cream for any commercial purpose, no other system can be considered in comparison with the separator. Its product is the sweetest, freshest, most uniform, freest from taints, may be easily run of any desired consistency—from the lightest to the heaviest—and is superior in every respect. In all the larger cities, and in many smaller places as well, the best trade can now be satisfied with nothing but "separator" cream, and the price commanded is proportionately greater.

Saving of Ice

With the separator the milk is best separated while retaining its natural warmth, as quickly as possible after coming from the cow, no ice or water being required to cool, keep or cream it. No setting system can be used without ice with even moderate success (except with very cold spring water), the more of it used the better being the results attained, and every user of such a system can readily determine what a saving and convenience it would be to do without it.

Saving of Time, Labor and Plant

In the use of the separator the separating may be done anywhere, but usually in a place close to the milking, and while the milking is going on, so that a few minutes after the milking is over the separation is finished, the skim-milk is at once fed to the stock, or otherwise disposed of, and the cream is put away to ripen for churning. Five to ten minutes cleans the machine, and within thirty minutes of milking the whole work of creaming is done. There is no carrying, repeated handling, storing away, and constant repairing and renewing of cumbersome cans and pans. There is no getting and applying of ice, nor pumping and handling of water. There is no need of long and tedious washing of many things, or perhaps the leaving of utensils unclean to injure the product every time they are used. There are no flies to fight, no fires to keep for warming skim-milk, no getting up to look after milk at all hours. There is no need of a milk-house, an ice-house, nor any of the many appurtenances necessarily a part of gravity setting. The separator saves the women of the house the drudgery of dairying without increasing the work of the men. *It transforms what has ever been an unendingly wearying and burdensome labor into an agreeable and satisfactory feature of farm and household occupation.*

Incidental Benefits

The centrifugal separator has for seventeen years been the "key-stone" of progress in dairy farming. It has been the most potent of dairying educators, and its introduction has almost invariably proved the stepping-stone to advancement in every feature of dairy work and character of methods and utensils. It is an object lesson in up-to-date machinery, dairying and otherwise. It is usually soon followed by a Babcock Tester, showing the actual butter-fat value of the milk of each cow, the weeding out of the poorer cows, an up-to-date churn, the use of better salt, better color, greater cleanliness, a more intelligent understanding of butter-making generally, and naturally the production of a better quality and higher-price grade of output. Such improvement must necessarily lend its influence to other lines of farm work, and the "leaven" of progress which the introduction of the separator provides is inestimable in its widespread results.

Would a Cream Separator Pay YOU?

There is nothing very difficult in determining the answer to this question upon the part of every owner or maker-up of the product of five—or even one—or more cows. The considerations involved are capable of easy and accurate reckoning, and there is hardly any one who cannot simply and readily decide the question for himself, and make no possible mistake in doing so.

To begin with, you are, of course, keeping cows *for profit*, or, in other words, *as a business*, or a branch of your business of farming. Therefore you may properly take up this question as a business man would consider any other business proposition.

How many cows have you? What is their product in volume of butter and in dollars and cents? What is your present creaming system? You probably have some conception of its wastefulness. Stop to think, in addition, of its cost in time and labor; its trying, burdensome and objectionable features in many respects.

Get these points and figures together for your consideration, just as any manufacturer or merchant would do in determining the wisdom of a change or investment affecting his business. Then consider the facts herewith presented, reduce them to figures to fit your own individual case, and compare them with your present results. Take it for granted that the facts presented are sound and true, as is the case, and as will be guaranteed you as a condition of your purchase of a De Laval Separator.

Quantity.—If you use an improved creamer *with ice*, add 10 per cent. to your total production of butter, for increase in yield. If you use such a creamer *without ice*, add 20 per cent. If you use simply pans or crocks, or practice similar setting, add 30 per cent. If your climate is warm or variable, add another 10 per cent. during such seasons, no matter what your system.

Quality.—If you use an improved creamer, add two to five cents to the value of each pound of butter, according to the price you may now be obtaining, for improvement in quality. If you may simply be practicing old-fashioned setting, in the usual manner, add from five to ten cents, according to same condition.

Water—Ice.—If you use ice or pump water in creaming your milk, figure what ice and its storage, handling, time and labor costs you or represents to you in the course of a year, and what the saving of same would mean to you.

Skim-Milk.—Estimate the present value of your skim-milk, as nearly as you can, no matter what the use to which you may put it, and then double or treble such estimate by reason of having it warm, sweet and fresh from the cow,

possessed of its full degree of nutritive qualities in such natural state. Consider, too, in addition, the time, labor and trouble saved in having to warm it if used in feeding in your present way.

Time—Labor.—Estimate as nearly as you can a saving of one-half the time in churning ; the saving of time in handling, setting and skimming the milk ; the saving of time in washing and caring for the setting utensils ; and particularly the drudgery of all this work to the already over-burdened housewife or daughter.

The Inevitable Conclusion

Add the results of these estimates together. Thus you will have before you in simple, plain, undeniable form what a De Laval Separator would save **you**. Thus you may readily determine for yourself whether a separator would pay **you** or not.

You cannot possibly help finding that in all of these ways together it would certainly save its cost for **you** at least every year, just as it invariably has for thousands of others. You cannot possibly help finding that so far from there being a question about your being able to afford it, there is on the contrary no question but that **you** cannot afford to be without it.

The Separator Not High in Cost

If unfamiliar with the centrifugal cream separator its cost may on first consideration seem rather high, and may appear more of an investment than you can well make. This, however, is easily shown to be foolish and mistaken reasoning. In farming, dairying, housekeeping, and everything else, there must, of course, be *some investment* as in any other business undertaking or enterprise. It is seldom possible to accomplish much, if anything, with nothing, and he who attempts it generally wastes a good

part of what is a short lease of earthly existence at most. Success in every producing element of life depends upon a wise discrimination between that which is a *good* investment of money or effort and that which is a *poor* one. It must be clear to you upon reflection that the separator is not only a *good* investment at its cost, but that it would still be so if its cost were *five times* as great as it is, *and that there is no other way in conjunction with the farm or the dairy to make the same investment return you one-tenth as much.* Therefore, the *cost* of the separator is *not high*, but, on the contrary, from an investment and productive standpoint, *very low*.

Without regard to the returns it makes you, however, the separator is not high in price, but in reality the cheapest piece of machinery on the farm. In the first place the De Laval machines are of the very highest and most expensive type of mechanism in all respects. No other agricultural machinery approaches them in quality of construction and finish. They are made as such machines must be made to stand 6,000 or 7,000 revolutions a minute twice a day for every day in the year, and last virtually a lifetime. You come in contact with no other piece of machinery that would stand the wear and strain of such use a month—let alone twenty to fifty years. In the second place, compare the separator with the drill, the reaper, the thresher, and other kindred machinery. These implements are used but a few days, or a few weeks at most, in the entire year. The rest of the time they produce nothing, and are simply a source of care. *The separator is used twice a day every day in the year, and is saving and producing you something every time you put milk through it.*

The man who lets *first cost* stand in the way of his purchase of a separator, no matter how he may be compelled to acquire the money for its purchase, simply stands in his own financial light, and can hardly sustain any course of reasoning, even to his own satisfaction, for doing so.

Purification of Products

No subject in connection with dairying is receiving more conspicuous attention than that of the necessary purification of dairy products. Experiment invariably demonstrates that the greatest care and the most thorough straining will not keep or take all of the dirt and filth out of milk. One who sees the refuse left in a separating bowl, after a separation run, no matter how carefully the milk may have been strained, is not likely to agreeably use milk again for some little time. Of still greater importance, however, are the harmful bacteria and disease-creating germs existing in milk or capable of development in it. The most commonly serious of these are the tuberculosis or consumptive germs, the dangerous importance of which has already been made the subject of legislation in many States.

What is true of milk in this respect is still more so of cream and butter, since in practically all gravity processes almost all of the filth and bacteria matters are taken from the milk with the cream, and the latter rapidly multiply in same. It is found that the centrifugal separator, and more especially the "Alpha-Disc" or milk-strata system now used in the improved De Laval machines, gathers and holds in the bowl of the separator practically all of the filth, fibrous and slime matters contained in greater or less degree in all milk, including the bacteria germs.

Many large city milk concerns have already begun or are now arranging to run their milk through "Alpha-Disc" Separators solely for cleansing and purifying purposes, the milk and cream being emulsed together again before delivery from the machine. Constantly increasing attention is being given to this subject, both in America and Europe, and in some European cities milk centrifuging is already largely in vogue. It is altogether probable that in the near future pure-food laws will preclude the sale of other than centrifuged dairy products, from whole-milk to butter.

NEW 20TH CENTURY Styles, Capacities, Prices, &c.

January 1st, 1900.

September 1st, 1899, marked the introduction of the Improved 20th Century "Baby" or "Dairy" sizes and styles of "Alpha" De Laval Cream Separators. These improvements denote another advance in centrifugal cream separator construction and efficiency. Great as has been the universally conceded superiority of the De Laval machines heretofore, the standard is now raised still higher. As near practical perfection as have been the De Laval Separators the past year, the latest improvements make them still better, until it is difficult to-day to perceive the possibilities of further improvement.

There has been a two-fold purpose upon the part of the De Laval makers in this respect. In the first place, they have had their skilled experts at work for three years to devise every conceivable means of bettering their machines, with which to fittingly celebrate the trade opening of the new century. Following precedent in the development of the De Laval machines no expense has been spared to this end. Nor has cost of production been considered in the determination of the makers to give the 20th Century purchasers of a De Laval Separator as nearly perfect a machine for the purpose as twenty years of experience could devise and the finest shops of the kind in the world produce. That this result has been handsomely achieved will be instantly apparent to any one familiar with cream separators on *seeing* the new machines. And when it comes to *operating* one of them the previous user of separators will readily find that the 20th Century machines are in a class by themselves in efficiency

and completeness, while the *longer* he uses one of them the greater will be his appreciation of its superior practicability and durability.

In the second place, while the sale of the De Laval machines has always been five times that of all others combined, it has been a problem with the De Laval makers for several years how best to so convincingly demonstrate the all-around greater merit of the "Alpha" machines to every intending buyer as to make their use as universal as the overwhelming superiority of the "Alpha-Disc" construction justifies it should be and must ultimately make it, and thus lessen the temptation of the inexperienced buyer to take chances with one of the inferior and supposedly "cheaper" separators which the expiration of the original patents on the "hollow bowl" type of separator has led several former manufacturers of gravity creamers to take up and attempt to find a market for on their own account. This the De Laval makers confidently believe they have accomplished in the machines now launched upon the market. These machines are now advanced so far beyond everything else for the clarification of milk and the separation of cream from milk that they are simply unapproachable in principle except through infringement of the "Alpha-Disc" process, and in mechanical construction and practical cheapness except through manufacture on as large a scale and with equal experience,—all of which, moreover, must be readily and convincingly apparent to any one with even the most casual consideration.

While, furthermore, the universal centrifugal separation of cream and centrifugal clarification and purification of whole-milk for human consumption, which the next five to ten years should bring about, is necessarily dependent upon thoroughly practical machines for inexperienced home and farm use—machines large in capacity and *easy of hand operation*, simple, durable, complete in finish and attachments, thoroughly efficient, and at the same time reasonably low in price in proportion to resulting benefits. Such separators

the De Laval makers present to the public in the new 20th Century machines—machines for everybody, that nobody can criticise and nobody ask for anything better or cheaper.

New 20th Century Styles and Sizes

The De Laval “Baby” or Dairy Cream Separators are now made in *eight* different sizes and styles. The Old Style “Baby” No. 1 machine is of the earlier “plain” or “hollow” bowl type. All of the other machines are of the improved “Alpha” or “Disc” construction. The “Humming-Bird” is solely a hand machine. The Dairy Turbine is solely a steam-motor machine. All of the other sizes are capable of convenient use either by hand or power.

It should be understood that the “Baby” machines are especially designed and constructed for *hand* use, *and four-fifths of them are altogether used in such way*. The mechanical construction of the machines in this respect is one of their most important features. The De Laval machines *are* hand machines in every sense, and are intended for use in such manner. *The operation is surprisingly easy, and many are run wholly by women and children*. Still, when users may prefer, from one reason or another, to attach to power the machines may be readily connected with light and uniform power of any kind, from dog or calf tread to water-motor or engine.

The “Baby” machines range in capacity from 150 lbs. to 850 lbs. of milk per hour. By capacity is meant the separating capacity of whole-milk per hour. Any amount of milk from a gallon upward may be separated with either of the machines, it being simply a question of duration of run, according to quantity to be put through.

Old Style “Humming-Bird”

The Strap “Humming-Bird” or Old Style “Baby” No. 0 (see cut page 28) is the smallest of the “Alpha” disc bowl type of “Baby” machines. It is designed for household

and small dairy use, with the milk of from one to five cows. It is operated with a ratchet strap instead of a crank—the motion being that of pulling an oar toward one—and is extremely easy of operation, being easily capable of use altogether by women and children. Its capacity is 175 lbs., and reduced price \$50.

New Style “Humming-Bird”

The Crank “Humming-Bird” or New Style “Baby” No. 0 (see cut page 29) is a later and somewhat improved pattern of the “Humming-Bird” size of machine, being of gear construction, and built for crank operation upon practically the same lines as the larger “Baby” machines. The 20th Century Crank “Humming-Bird” is made stronger in several structural respects than previous machines of the same style. It possesses every advantage and improvement of the larger machines, and is meeting with a largely increasing sale, both to small dairy farmers having less than 6 or 8 cows and to owners of 1 or 2 cows for private use, and gradually into city and village homes where milk is bought for household uses. There is also a constantly increasing use of this machine by small hotels and restaurants, that cream of the best quality may be readily made as wanted, and the surplus of milk turned into superior butter. The Crank “Humming-Bird” is *most extremely easy of operation*, the operator sitting in running it, almost without effort. Its increased capacity is now 225 lbs., and price \$65.

Old Style “Baby” No. 1

The Old Style “Baby” No. 1 (see cut page 30) is of the older “plain” or “hollow” bowl type of separator, as explained. In pattern and mechanism, aside from the bowl, it is much the same as the “Baby” No. 2. It is intended for use in small dairies. It is not represented to be equal in general practicability to the “Alpha” disc bowl type of machines. It is, however, in many respects superior to imitating “hollow” bowl separators, and considerably

superior to any gravity-system. Its capacity is 150 lbs., and its price in ten years has been gradually reduced from \$125 to \$50 at this time.

Improved Iron-Stool "Baby" No. 1

The Improved or New Style "Baby" No. 1 (see cut page 31) is a recently created size of "Alpha" disc bowl type of machine, designed especially to meet the needs of the user thinking himself unable to afford the cost of the larger "Baby" No. 2 machine, and preferring to give more time to the separation rather than to go beyond absolute necessity in first cost. It is intended for dairies of 5 to 10 or 15 cows, though the use of the larger capacity No. 2 machine is recommended as more practicable and economical, in the long run, in dairies of 8 or more cows. The improved machine is of the latest spring-bearing pattern, has a handsome iron supporting stand or stool furnished with it as a part of the machine, and is provided with gear shield in protection of the driving wheel and pinion. Its increased capacity is now 325 lbs., and price \$100.

Improved Iron-Stool "Baby" No. 2

The Iron-Stool "Baby" No. 2 machine (see cut page 32) is the latest improved type of the widely known low-frame style of "Baby" No. 2 machine. It is now made with a handsome iron stool or supporting stand, which is furnished as a part of the machine. It is also of the latest spring-bearing pattern and is supplied with gear shield in protection of driving wheel and pinion. The "Baby" No 2 is the best known and heretofore most widely used dairy separator, and is *the* size of machine which has been mainly instrumental in revolutionizing farm dairying. As now made it possesses many improvements over any previous form. It is intended for dairies of from 5 to 20 or 30 cows, and is often used in even larger ones. Its increased capacity is now 450 lbs., and price \$125.

Improved High-Frame "Baby" No. 2

The High-Frame "Baby" No. 2 (see cut page 33) is a comparatively new style of this size of machine, made in high continuous frame pattern similar in design to the well-known "Baby" No. 3. In other respects it is identical with the Improved iron-stool style of machine. The intending purchaser of No. 2 size of machine may thus choose between the two styles as shown in cuts. The general preference is for the iron-stool style, by reason of its greater convenience under varying setting conditions, while others consider the solid continuous frame more stable. The capacity and price of the high-frame machine are the same as those of the iron-stool one—450 lbs. and \$125

Improved "Baby" No. 3

The "Baby" No. 3 (see cut page 34) is essentially the same as the "Baby" No. 2, other than that it is designed on a larger scale throughout. It is of the continuous solid frame pattern. Users of separators are beginning to appreciate the many greater advantages of creaming their milk quickly, as well as the economy of saving time in separation as in everything else. The No. 3 is designed for dairies of from 20 to 75 or more cows, but is now being largely used in dairies of even 10 or 15 cows, and frequently still fewer, by reason of its doing the same work in about half the time necessary with the No. 2. Its increased capacity is now 850 lbs., and price \$200.

Improved Dairy Turbine

The larger "Baby" or No. 3 machine is also constructed in the form of a Dairy Turbine (see cut page 35) for direct steam pressure connection. It is of exceptional excellence in its mechanical construction, and utilizes the latest improved principles of the De Laval Steam-Turbine Factory styles of machines, including the steam-tooth wheel motor mechanism.

The turbine or steam pressure power, however, is alone applicable to this type of machine, and such means of operation is only advisable for farm and dairy requirements where power is desired to be used with the separator but not for churning and other kindred work, in which—unless otherwise provided for—it is more necessary than in separating with the De Laval machines. This form of power is never economical or practicable in a smaller separator, and only under these exceptional conditions with one of this size. The increased capacity of the Dairy Turbine is now 850 lbs., and price \$225.

Pulleys for Power Connection

When power is desired to be used with the “Baby” machines, several forms of pulleys are practicable. With the No. 1 and No. 2 machines direct lever connection may be made between the hand crank and dog or sheep tread powers, without pulleys or belting. Where pulleys are necessary, one may be used which is interchangeable with the hand crank, and to which pulley a special form of crank for hand use may be directly attached, if desired. This pulley costs \$2.50 for the No. 1 and No. 2 machines, and \$3 for the No. 3 machine. Or, where perhaps the machine is to be used altogether by power, the crank and external gear mechanism may be removed, and either a set of tight and loose pulleys or a single ratchet pulley used on the lower shaft, which method of power connection is often more practicable by reason of the higher speed of this lower shaft. The cost of either of these styles of pulleys is \$6.

Power or “Creamery” Separators

Where larger machines than the “Baby” sizes of separators are wanted, as in dairies of 75 or more cows, or creameries and factories, catalogue should be procured of the “Alpha” and other regular power or creamery styles and sizes of De Laval Separators, which range in capacity

from 1,100 lbs. to 4,500 lbs., and in price from \$250 to \$800, and which are made in various different forms and styles, and are the machines now almost universally used in creamery or factory operation.

Terms, etc.

The De Laval machines are now so well introduced in nearly every section, and are so highly endorsed by all dairy and public authorities and innumerable well-known users everywhere, that it is no longer deemed necessary to place machines "on trial," but they may usually be obtained subject to approval through any of the regular agents, and in every sale **superiority** in all essential respects to any other machine or system, and **satisfaction** to the user is voluntarily **guaranteed** as a condition of purchase.

The list prices of the De Laval machines are in all cases as low as is consistent with the merit and mechanical excellence and completeness which the buyer rightfully expects in the purchase and illimitable use of the machines. Therefore, the prices are *net at list* to one and all alike. There are no "trade" discounts to any one. There are no agents except the regular ones covering specific territories. *No agent is permitted to discount prices to any one under any circumstances.* All machines are f. o. b. cars at the Company's General Works, Poughkeepsie, N. Y.; Western Stores, Chicago; Pacific Stores, San Francisco, or Canadian Works, Montreal.

Cuts showing the different styles of "Baby" machines, as herein described, will be found on the following pages, and have been designed to show the machines as they are.

Orders may be placed through or any desired information may be obtained of the regular agents and dealers representing and handling the De Laval machines, or directly of the Company.

The De Laval Separator Co.

STRAP "HUMMING-BIRD"

("Alpha" or "Disc" Bowl Type)

DE LAVAL CREAM SEPARATOR

(See page 22)

Actual Capacity, 175 Lbs. Per Hour

(Equal to 225 lbs. "claimed" capacity in any other make of separator, regardless of other differences)

PRICE - - \$50 00

CRANK "HUMMING-BIRD"

("Alpha" or "Disc" Bowl Type)

DE LAVAL CREAM SEPARATOR

(See page 23)

Actual Capacity, 225 Lbs. Per Hour

(Equal to 300 lbs. "claimed" capacity in any other make
of separator, regardless of other differences)

PRICE - - \$65.00

OLD STYLE "BABY" NO. 1
(**"Plain" or "Hollow" Bowl Type**)
DE LAVAL CREAM SEPARATOR

(See page 23)

Actual Capacity, 150 Lbs. Per Hour

(Equal to 200 lbs. "claimed" capacity in any other make
of separator, regardless of other differences)

PRICE = = \$50.00

IRON-STOOL "BABY" NO. 1

("Alpha" or "Disc" Bowl Type)

DE LAVAL CREAM SEPARATOR

(See page 24)

Actual Capacity, 325 Lbs. Per Hour

(Equal to 400 lbs. "claimed" capacity in any other make
of separator, regardless of other differences)

PRICE - - \$100.00

IRON-STOOL "BABY" NO. 2
(**"Alpha" or "Disc" Bowl Type**)
DE LAVAL CREAM SEPARATOR

(See page 24)

Actual Capacity, 450 Lbs. Per Hour

(Equal to 550 lbs. "claimed" capacity in any other make
of separator, regardless of other differences)

PRICE - - \$125.00

HIGH-FRAME "BABY" NO. 2

("Alpha" or "Disc" Bowl Type)

DE LAVAL CREAM SEPARATOR

(See page 25)

Actual Capacity, 450 Lbs. Per Hour

(Equal to 550 lbs. "claimed" capacity in any other make of separator, regardless of other differences)

PRICE = = \$125.00

HIGH-FRAME "BABY" NO. 3
(**"Alpha" or "Disc" Bowl Type**)
DE LAVAL CREAM SEPARATOR

(See page 25)

Actual Capacity, 850 Lbs. Per Hour

(Equal to 1,000 lbs. "claimed" capacity in any other make
of separator, regardless of other differences)

PRICE = = \$200.00

"DAIRY" STEAM-TURBINE

("Alpha" or "Disc" Bowl Type)

DE LAVAL CREAM SEPARATOR

(See page 25)

Actual Capacity, 850 Lbs. Per Hour

(Equal to 1,000 lbs. "claimed" capacity in any other make of separator, regardless of other differences)

PRICE = = \$225.00

Imitating Machines and Systems

There is little to be said on this score. The "Alpha" De Laval machines have always stood so far above everything else in the separation of cream from milk that they have known little actual competition. *Their sale is more than ten times that of all imitating machines and other cream-separating systems combined.* In fact they have never experienced such a thing as *honest* competition at all. The only competition possible has been through misrepresentation upon the part of would-be competitors with inferior and cheaply made machines, through gross exaggeration of *actual* capacity and degree of *practical* efficiency, in conjunction with the pretense of offering something "cheaper," which sometimes appeals to the inexperienced dairy purchaser, as may be understood.

The users of creamery or factory separators, where the differences in separator efficiency and practicability are naturally more readily apparent, have for several years almost universally recognized the overwhelming superiority of the De Laval machines. From year to year this has become more and more the case with farm and dairy users as well, as such users have profited by their own experience or that of others known to them. While now the new 20th Century improvements so much further enhance the superiority of the De Laval machines as to simply place them beyond the reach of competition. Where there have heretofore been second, third and fourth class separators, as compared with the De Laval, the New Century De Laval machines simply stand in a class by themselves, with nothing in the shape of attempted competitive machines even deserving of the name of *second* class—all other machines to-day being no better than third, fourth or fifth class, as the case may be.

Such inferior and imitating machines as may be found

advertised (and they are more frequently *advertised* than *used* for any great length of time) may be summed up in a few words. A number of them are not centrifugal machines at all, but simply so-called "separators" utilizing gravity in conjunction with water dilution. These are mere fakes, inferior to ordinary gravity creamers, and possessed of but the single merit of the name they fraudulently misappropriate. Others are, correctly speaking, centrifugal machines, but these are all of the "plain" or "hollow" bowl type, the manufacture of which is now permissible by reason of the expiration of the earlier De Laval patents, and has been brazenly taken up by several of the former gravity creamer manufacturers, who bitterly fought the progress of centrifugal separation until the success of the De Laval machines overwhelmed them.

These "plain" or "hollow" bowl machines are inferior to the improved "Alpha" disc De Laval machines in every respect. They are simply on a par in separation principles with the De Laval machines of ten years ago. They do not nearly approach the "Alpha" disc machines of to-day in any single point of separator practicability. They are made in small numbers and without the necessary experience in separator construction. Few, if any, of them will stand the test of several years of wear. In the effort to somewhat nearly approach the capacities of the "Alpha" disc machines, their bowls are made from 50 to 100 per cent. larger, and are run at from 50 to 100 per cent. greater speed. All this, of course, is at the expense of operating power, safety, durability and quality of product. From the same reason their *hand* use is difficult and in the larger dairy sizes impossible. Necessarily rated at their utmost they possess no *reserve* capability, with which to meet varying separation conditions. They are made cheaply in the necessary effort to apparently sell under the price of the De Laval machines, and *are* "cheap" machines in every sense but that of practical economy.

AMERICA'S HIGHEST DAIRYING AUTHORITY ON CREAM SEPARATORS

UNIVERSITY OF WISCONSIN

Experiment Station, Madison, Wis.

"The use of the Hand Separators is a great boon to the progressive dairy farmer who is making the most out of his milk by manufacturing it at home. The amount of fat which many dairymen lose in the skim-milk is surprisingly large, and only because they do not know that such is the case do these dairymen daily suffer this loss. We have tested skim-milk for men who thought they were pretty good dairymen where there was as much as 1 per cent. of fat remaining in the skim-milk though generally the loss is about one-half that, as shown by our tests. Now think of it for a moment: If the full milk contains 4 per cent. of fat, and the dairyman loses one-half of 1 per cent. of this fat by imperfect creaming, there is a loss of $12\frac{1}{2}$ per cent. by the old method, about all of which is saved without difficulty through using a good Hand Separator. To care for the cows, milk them and handle the milk, and then each day lose $12\frac{1}{2}$ per cent. of the fat produced, is permitting a continual loss which no thoughtful dairyman will long stand when he comprehends the situation. By the use of the 'Baby' Hand Separator the milk can be at once almost completely rid of the fat, leaving the warm skim-milk fresh for the calves and pigs, while the cream only need receive further careful attention. With the Hand Separator and the milk test the progressive dairyman is now master of the situation.

"Continued experience in our creamery, which we operate in a practical way as well as for experimentation and instruction, has given us still higher appreciation of the 'Alpha' De Laval Separators. The exhaustiveness of their skimming under the varying conditions of milk-flow and temperature continues highly satisfactory, and the machines give full evidence of lasting qualities under daily use."

W. A. HENRY,
Dean and Director.

HIGHEST PRIZE HONORS

THE DE LAVAL CREAM SEPARATORS have received nearly Two Thousand Prizes, Medals, Awards and Diplomas, during the twenty years they have been before the public. Five hundred of these awards have been Prizes and Medals from Fairs and Exhibitions of marked importance. The collection is representative of every World's Fair and International Exposition during such period, every State and almost every county of the United States, and every civilized country and province in the world.

At the World's Fair, Chicago, in 1893, the De Laval Cream Separators were solely selected by the Official Committee of Experts and Experiment Station Representatives for use in the Practical Working Dairy of the Great Fair, where their work received the highest possible commendation. And in the Exhibition Department they received exceptional Honors in being awarded the only Medal and Diploma regularly given to centrifugal creaming apparatus.

In the later World's Expositions, at Antwerp in 1894 and Brussels in 1897, the De Laval machines well sustained their previous Fair and Exposition record and further demonstrated their overwhelming international superiority. They received the Grand Prizes at each of such expositions.

At the Trans-Mississippi Exposition, Omaha, last year, while there was no competitive separator contest, the "Alpha" De Laval machines received the only Gold Medal awarded exclusively on cream separators.

The most important practical operation contest between separators in recent years was conducted by the Royal Agricultural Society of England at its 1899 Annual Show at Maidstone, Kent, in June. The "Alpha" De Laval machines easily won First Prizes in both hand and power classes.

TESTIMONIALS

THE DE LAVAL "BABY" CREAM SEPARATOR testimonial letters have long since outgrown the possibilities of catalogue printing. The number on file is fully 25,000, and it would take the average reader a year to read them.

These letters of practical experience, however, are very interesting and instructive, since they are illustrative of what has been the actual experience of every user of a "Baby" Separator, and what must be the experience of every new user having use for such a machine. They form the most practical sort of an *education* in the general and indisputable advantages of centrifugal separation.

Therefore, a number of the very newest of these letters, selected as coming from representative and widely known dairymen in different sections, and as covering all the different branches of dairying and varying conditions under which separators are used, are printed in current monthly pamphlets which will be cheerfully sent to any one on request

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